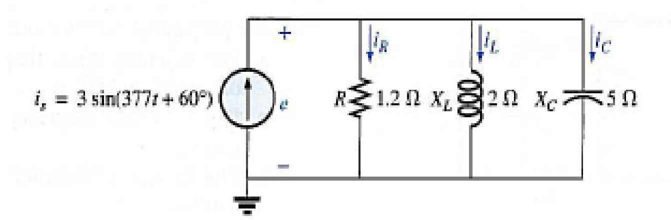
For the circuit of Figure

(a) Find the total admittance Y_T in polar form.



The circuit contains a resistor R = 1.2Ω, an inductor of reactance of XL = 2Ω and a capacitor of reactance 5Ω in parallel. The impedance in the different branches of the parallel circuit are

$Z_1 = (1.2 + 0\,j)\Omega = 1.2\angle 0$ gives $Y_1 = 0.833 + 0\,j$

$Z_2 = (0 + 2\,j)\,\Omega = 2\angle 90^0$ gives $Y_2 = 0 - 0.5\,j$

$Z_3 = (0 - 5\,j)\,\Omega = 5\angle -90^0$ gives $Y_3 = 0 + 0.2\,j$

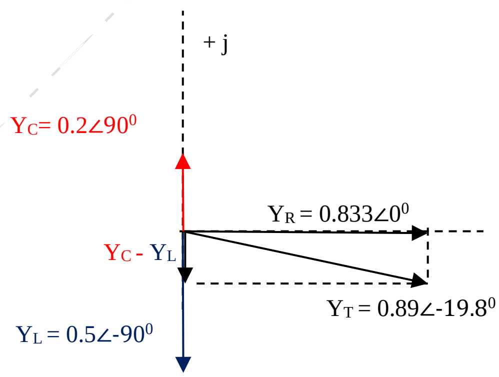
Hence the total admittance of the circuit will be

$Y = Y_1 + Y_2 + Y_3 = 0.833 - 0.3\,j = (0.8333^2 + 0.3^2)^{½} \angle \tan^{-1}(-0.3/0.8333)$

$= \mathbf{0.89 \angle -19.80^0\ \Omega^{-1}}$

(b) Draw the admittance diagram.

The admittance diagram is shown in the figure



(c) Find the value of C in microfarads and L in Henri.

The current in the circuit is

$I = 3 \sin(377t + 60^0)$

This gives the value of the angular frequency $\omega = 377$ rad./s

As the inductive reactance $X_L = L\omega = 2\,\Omega$ we get

$L = X_L/\omega = 2/377 = \mathbf{5.3*10^{-3}\ H} = 5.3$ mH

Similarly the capacitive reactance is

$X_C = 1/C\omega = 5\,\Omega$ we get

$$C = \frac{1}{\omega X_C} = \frac{1}{377*5} = 5.3 * 10^{-4} F = 530 * 10^{-6} F = \mathbf{530\ \mu F}$$